CLAIMS:

1. A lithographic projection apparatus comprising:

a radiation system configured to provide a pulsed beam of radiation;

a programmable patterning structure configured to pattern the pulsed beam according to a desired pattern;

a projection system configured to project the patterned beam onto a target portion of a substrate;

a positioning structure configured to move the substrate relative to the projection system; and

an optical structure configured to move the projected beam relative to the projection system during at least one pulse of the pulsed beam such that the projected beam is substantially stationary relative to the substrate during said at least one pulse.

2. The lithographic projection apparatus according to claim 1, wherein the positioning structure is configured to move the substrate at a substantially constant velocity relative to the projection system during the course of a plurality of pulses of the radiation system and the intervals therebetween, and

wherein the projected beam is moved in synchronism with the movement of the substrate for the duration of at least one pulse of the pulsed beam.

3. The lithographic projection apparatus according to claim 1, wherein the projected beam is moved in synchronism with the movement of the substrate during a plurality of pulses of the pulsed beam such that a pattern of the programmable patterning structure is projected onto substantially the same place on the substrate a plurality of times.

4. The lithographic projection apparatus according to claim 3, wherein a configuration of the programmable patterning structure is changed between the plurality of projections onto substantially the same place on the substrate.

5. The lithographic projection apparatus according to claim 3, wherein at least one of an intensity of the projected beam, an illumination of the programmable

patterning structure, and a pupil filtering are changed for at least one of the plurality of projections onto substantially the same place on the substrate.

6. The lithographic projection apparatus according to claim 1, wherein said optical structure comprises:

a layer of electro-optical material arranged in a path of the projected beam; and

a control system configured to apply a control voltage across at least a portion of the layer of electro-optical material,

wherein a birefringence of the electro-optical material of the layer varies according to a voltage across the material.

7. The lithographic projection apparatus according to claim 6, wherein the apparatus is configured such that the projected beam is polarized, and

wherein an optical axis of the layer of electro-optical material is oriented such that substantially all of the projected beam is moved.

8. The lithographic projection apparatus according to claim 6, wherein said optical structure further comprises a second layer of electro-optical material arranged in a path of the projected beam and across at least a portion of which the control system configured to apply a second control voltage,

wherein a birefringence of the electro-optical material of the second layer varies according to a voltage across the material, and

wherein a direction of an optical axis of the second layer of electro-optical material is substantially perpendicular to a direction of an optical axis of the first layer, such that changing the birefringence of both layers moves substantially all of the projected beam.

9. The lithographic projection apparatus according to claim 1, wherein said optical structure comprises a reflective surface mounted such that an angle between the surface and the projected beam incident upon it varies during a pulse of the pulsed beam.

10. The lithographic projection apparatus according to claim 9, wherein said optical structure comprises a rotating prism having a plurality of edge faces, and

wherein at least one edge face is the surface on which the patterned projection beam is incident during the pulse of the pulsed beam.

11. The lithographic projection apparatus according to claim 1, wherein said optical structure comprises an element that is transmissive to the beam of radiation, mounted such that an angle between the projected beam and a surface of the transmissive element on which it is incident varies during a pulse of the pulsed beam.

12. The lithographic projection apparatus according to claim 11, wherein said optical structure comprises a rotating prism having a plurality of edge faces, and

wherein at least one edge face is the surface on which the patterned projection beam is incident during the pulse of the pulsed beam.

13. A device manufacturing method, said method comprising:

using a radiation system to provide a pulsed beam of radiation;

using a patterning structure to pattern the pulsed beam according to a desired pattern;

projecting the patterned beam onto a target portion of a layer of radiation-sensitive material that at least partially covers a substrate;

moving the substrate relative to the projection system; and

moving the projected beam relative to the projection system during at least one pulse of the pulsed beam such that the projected beam is substantially stationary relative to the substrate during said at least one pulse.

14. A device manufactured according to the method of claim 13.

15. A lithographic projection apparatus comprising:

a radiation system configured to provide a pulsed beam of radiation;

a programmable patterning structure configured to pattern the pulsed beam according to a desired pattern;

a projection system configured to project the patterned beam onto a target portion of a substrate;

a positioning structure configured to move the substrate relative to the projection system; and

an optical structure configured to alter a path of the projected beam relative to the projection system during at least one pulse of the pulsed beam such that a cross-section of the projected beam in a plane parallel to a surface of the target portion is substantially stationary relative to the substrate during said at least one pulse.

16. The lithographic projection apparatus according to claim 15, wherein said optical structure comprises:

a layer of electro-optical material arranged in a path of the projected beam; and

a control system configured to vary a birefringence of at least a portion of the layer of electro-optical material according to a control voltage.

17. The lithographic projection apparatus according to claim 16, wherein said optical structure further comprises a second layer of electro-optical material arranged in a path of the projected beam and across at least a portion of which the control system configured to apply a second control voltage,

wherein the control system is further configured to vary a birefringence of at least a portion of the second layer of electro-optical material according to a second control voltage, and

wherein a direction of an extraordinary axis of the second layer of electro-optical material is substantially perpendicular to a direction of an extraordinary axis of the first layer.

18. The lithographic projection apparatus according to claim 15, wherein said optical structure comprises a reflective surface mounted such that an angle between the surface and the projected beam incident upon it varies during a pulse of the pulsed beam.

19. The lithographic projection apparatus according to claim 18, wherein said optical structure comprises an element that is transmissive to the beam of

radiation, mounted such that an angle between the projected beam and a surface of the transmissive element on which it is incident varies during a pulse of the pulsed beam.

20. A device manufacturing method, said method comprising:

using a radiation system to provide a pulsed beam of radiation;

using a patterning structure to pattern the pulsed beam according to a desired pattern;

projecting the patterned beam onto a target portion of a layer of radiation-sensitive material that at least partially covers a substrate;

moving the substrate relative to the projection system; and

altering a path of the projected beam relative to the projection system during at least one pulse of the pulsed beam such that a cross-section of the projected beam in a plane parallel to a surface of the target portion is substantially stationary relative to the substrate during said at least one pulse.

21. The device manufacturing method according to claim 20, wherein altering a path of the projected beam includes altering the path in synchronism with said moving the substrate during a plurality of pulses of the pulsed beam, such that the desired pattern is projected onto substantially the same place on the target portion a plurality of times.

22. The device manufacturing method according to claim 21, wherein a configuration of the programmable patterning structure is changed between the plurality of projections onto substantially the same place on the substrate.